Patent Claims

1.   Process for avoidance of collision when opening vehicle doors, characterized by the following steps:

--   determining a projected path of movement (6) of the own vehicle (4),

--   detecting objects (1) in the environment of the own vehicle (4),

--   determining the projected movement paths (2) of the detected objects (1),

--   determining a probability space (7) for the pivot area (5) of the vehicle doors and a probability space (3) for each detected object (1),

--   comparing the probability space (7) of the pivot areas (5) of the vehicle doors with the probability spaces (3) of the objects (1) so that a possible overlapping can be detected, and

--   producing a reaction signal indicating a danger of collision when an overlapping is recognized.

2.   Process according to claim 1, thereby characterized, that the movement paths are extrapolated from the past out to a pre-determined future period of time.

3.   Process according to one of claims 1 and 2, thereby characterized, that the reaction signal indicating danger of collision is produced when an overlapping of the probability spaces (3, 7) at a point in time and/or a certain duration of time is indicated.

4.   Process of according to one of claims 1 through 3, thereby characterized, that the probability space (7) for the pivot area (5) of the vehicle doors and the probability space (3) for the object (1) is determined by probability boundary curves (2a, 2b, 6a, 6b) of the projected movement tracks (2, 6).

5.   Process of according to one of claims 1 through 4, thereby characterized, that the reaction signal triggers an acoustic, optic or haptic warning, when the opening of the door is initiated or when the door is opened.

6.   Process according to one of claims 1 through 5, thereby characterized, that the reaction signal so controls the door lock, that the corresponding door is locked for at least a certain amount of time.

7.   Process according to one of claims 1 through 6, thereby characterized, that it is only carried out in the case that the speed of the vehicle (4) does not exceed a predetermined value and/or the opening of a door is recognized.

8.   Process according to one of claims 1 through 7, thereby characterized, that it is deactivated by manual switching-off, or by closing of the vehicle (4) from the outside, or when no person is inside the vehicle (4), or when the vehicle speed exceeds a pre-determined speed.

9.   Process according to one of claims 1 through 8, thereby characterized, that the output of the reaction signal is ended, as soon as the collision danger no longer exists.

10.   Device for avoiding collisions during opening of vehicle doors, with a collision monitoring unit (9) including

--   an evaluation unit (10a), which recognizes objects (1) in the environment of a vehicle (4) from sensor data from environment sensors and determines projected movement paths (2) for the detected objects (1) and which determines the projected movement path (6) of the vehicle (4) from sensor data from the vehicle sensors,

--   a micro-processor (10b), which is programmed to determine a probability space (7) for the vehicle (4) and probability paths (3) for the detected objects (1) and to recognize an overlapping of the probability space (3, 7), whereupon the micro-processor (10b) emits a reaction signal indicating danger of collision to a warning means or a control unit (13) in the case that an overlapping has been determined.

11.   Device according to claim 10, thereby characterized, that the collision monitoring unit (9) is designed to extrapolate from the past sensor data the movement path (2, 6) for a pre-determined period of time into the future.

12.   Device according to claim 10 or 11, thereby characterized, that the collision monitoring unit (9) is activated when the speed of the vehicle (4) drops below a pre-determined speed and/or the opening of a door is recognized.

13.   Device according to one of claims 10 through 12, thereby characterized, that the collision monitoring device (9) is deactivated, when the vehicle (4) exceeds a pre-determined speed and/or the vehicle (4) is closed from outside and/or by manual switching off.

14.   Device according to one of the preceding claims, thereby characterized, that the collision monitoring unit is connected to a bus system, via which data regarding location, size and/or number of doors is made available.

15.   Device according to one of the preceding claims, thereby characterized, that other traffic participants are alerted by optical or acoustic warning signals regarding imminent or

already occurring of the door opening if at the time the collision monitoring unit detects a danger of collision.